IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

SRC LABS, LLC & SAINT REGIS MOHAWK TRIBE, Plaintiffs, v. MICROSOFT CORPORATION, Defendant.	1:17-cv-1172-LO/JFA Case No. _____ JURY TRIAL DEMANDED

PLAINTIFFS' ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

TABLE OF CONTENTS

Plaintiffs SRC Labs, LLC and Saint Regis Mohawk Tribe file this Original Complaint for Patent Infringement ("Complaint") against Defendant Microsoft Corporation. Plaintiffs allege as follows:

I. NATURE OF THE ACTION

1. This is an action for infringement of U.S. Patent Nos. 6,076,152, 6,247,110, 6,434,687, 7,225,324, 7,421,524, and 7,620,800.

2. SRC Labs, LLC is a Texas limited liability company and its parent is the successor to SRC Computers.

3. Saint Regis Mohawk Tribe (the "Tribe"") is a federally recognized, sovereign American Indian Tribe located in upstate New York.

4. Microsoft Corporation ("Microsoft" or "Defendant") is a Washington corporation with its headquarters in Redmond, Washington.

II. JURISDICTION

5. This action arises under the Patent Laws of the United States, 35 U.S.C. § 1, *et seq.*, including 35 U.S.C. §§ 271, 281, 283, 284, and 285. This is a patent infringement lawsuit over which this Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has general and specific personal jurisdiction over Defendant because it is present in and transacts and conducts business in and with residents of this District and the Commonwealth of Virginia.

7. Plaintiffs' causes of action arise, at least in part, from Defendant's contacts with and activities in the Commonwealth of Virginia and this District.

8. In addition, upon information and belief, Defendant has committed acts of infringement within this District and this State by, *inter alia*, making, selling, offering for sale, importing, and/or using products that infringe one or more claims of the patents-in-suit.

9. Defendant, directly and/or through intermediaries, uses, sells, ships, distributes, offers for sale, advertises, or otherwise promotes products in the Commonwealth of Virginia and this District. Defendant regularly conducts and solicits business in, engages in other persistent courses of conduct in, and/or derives substantial revenue from goods and services provided to residents of the Commonwealth of Virginia and this judicial District.

III. VENUE

10. Venue is proper in this District because Microsoft meets all three general requirements relevant to the inquiry: (1) Microsoft has multiple physical places in the District, (2) they are regular and established places of business, and (3) the physical places belong to Microsoft. *See In re Cray Inc.*, No. 2017-129, 2017 WL 4201535, at *4 (Fed. Cir. Sept. 21, 2017).

11. Microsoft has been registered to do business in Virginia since October 29, 1993 (SCC ID F1157421).

12. Microsoft's Registered Agent/Registered Office is Corporation Service Company, Bank of America Center, 16th Floor, 1111 East Main Street, Richmond, Virginia 23219.

13. Microsoft operates two data centers located within the Alexandria Division of the Eastern District of Virginia, *i.e.*, in Ashburn and Bristow.

14. Microsoft also operates a data center in Boydton, Virginia, which is its east coast hub.

15. Microsoft has invested nearly $2 billion in its Boydton data center since 2010.[1]

16. Microsoft also has a Microsoft Technology Center located within the Alexandria Division, Reston, Virginia.[2]

17. Microsoft employs hundreds of people in the Eastern District of Virginia, many of whom will have knowledge relevant to this case.

18. Microsoft's data centers that contain the hardware and provide the services accused of infringement are all located in the Eastern District of Virginia.

19. The following people are employed by Microsoft and may have knowledge relevant to the issues in this case:

Name	Title	Location
Kalin Ovtcharov	Research Hardware Engineer at Microsoft	Toronto, Canada
John Demme	Senior FPGA Tools Engineer at Microsoft	New York, NY
Andrew Lenharth	FPGA Tools Engineer at Microsoft	Austin, TX
P.J. Grinsell	Cloud Architect (Azure) at Microsoft	Richmond, VA
Art Akerman	Americas Lead for Cloud Technology Incubation at Microsoft	Richmond, VA
Daniel Kaminsky	ASIC/FPGA technical lead at Microsoft	Israel
Bruce Lowekamp	Principal Architect at Microsoft	Richmond, VA

[1] http://www.datacenterknowledge.com/archives/2016/11/09/microsoft-build-probably-upgrade-boydton-data-center/.
[2] https://www.microsoft.com/en-us/mtc/locations/reston.aspx.

Jerry Shelton	Data Center Lead for Microsoft	Boydton, VA
Richard Tilghman	Data Center Build Manager at Microsoft	Richmond, VA
Doug Burger	Distinguished Engineer at Microsoft	Seattle, WA
Adrian Caulfield	Principal Research Hardware Development Engineer at Microsoft	Redmond, WA
Eric Chung	Senior Researcher at Microsoft	Seattle, WA
Andrew Putnam	Principal Hardware Engineer at Microsoft	Seattle, WA
Daniel Lo	Research Hardware Design Engineer at Microsoft	Redmond, WA
Stephen Heil	Principal Program Manager at Microsoft	Seattle, WA
Jeremy Fowers	Senior Hardware Engineer	Seattle, WA
Peter Lee	Head of Microsoft Research	Seattle, WA
Ray Bittner	Engineer at Microsoft	Seattle, WA

20. In addition, the following third-party witness has knowledge relevant to the issues in this case:

Name	Title	Location
Derek Chiou	Associate Professor at the University of Texas at Austin	Austin, TX

21. In summary, Microsoft has multiple physical locations that are regular and established places of business located within this District and within the Alexandria Division so venue is proper under 28 U.S.C. § 1400(b).

IV. THE PARTIES

A. Saint Regis Mohawk Tribe

22. The Saint Regis Mohawk Tribe is a federally-recognized, sovereign American Indian tribe with reservation lands in northern New York.

23. By filing this lawsuit, the Tribe has not expressly or impliedly waived its sovereign immunity to any *inter partes* review proceedings involving the patents asserted in this case or any other patent assigned to the Tribe.

24. The Tribe's reservation was established by a federal treaty approved and ratified by the United States.

25. The Tribe's current reservation constitutes 14,000 acres spanning Franklin and St. Lawrence Counties.

26. The Tribe has over 15,600 enrolled tribal members, with approximately 8,000 tribal members living on the reservation.

27. The Tribe provides essential government functions such as education, policing, infrastructure, housing services, social services, and healthcare. See https://www.srmt-nsn.gov/about-the-tribe.

28. But unlike other sovereign governments, the Tribe's ability to raise revenues through taxation is extremely limited.

29. This is a problem faced by all American Indian Tribes as described by the National Congress of American Indians ("NCAI"):

> In general, tribal governments lack parity with states, local governments, and the federal government in exercising taxing authority. For example, tribes are unable to levy property taxes because of the trust status of their land, and they generally do not levy income taxes on tribal members. Most Indian reservations are plagued with disproportionately high levels of unemployment and poverty, not to mention a severe lack of employment opportunities. As a result, tribes are unable to establish a strong tax base structured around the property taxes and income taxes typically found at the local state government level. To the degree that they are able, tribes use sales and excise taxes, but these do not generate enough revenue to support tribal government functions.

30. Because of these disparities, a significant portion of the revenue the Tribe uses to provide basic governmental services must come from economic development and investment rather than taxes or financing.

31. To overcome these economic disadvantages, the Tribe took steps to diversify its economy with investments in innovative businesses and various enterprises to foster jobs and entrepreneurship.

32. Looking to the business model already utilized by state universities and their technology transfer offices, the Tribe adopted a Tribal Resolution endorsing the creation of a technology and innovation center for the commercialization of existing and emerging technologies.

33. This new Tribal enterprise is called the Office of Technology, Research and Patents (the "Office") and is part of the Tribe's Economic Development Department. *See* https://www.srmt-nsn.gov/economic-development.

34. The Office's purpose is to strengthen the Tribal economy by encouraging the development of emerging science and technology initiatives and projects, and promoting the modernization of Tribal and other businesses.

35. The objective of the Office is to create revenue, jobs, and new economic development opportunities for the Tribe and its members.

36. The Office will also promote the education of Mohawks in the fields of science, technology, engineering, and math.

B. SRC Labs, LLC

37. SRC Computers, LLC was co-founded by Seymour R. Cray (hence "SRC"), Jim Guzy, and Jon Huppenthal in 1996 to produce unique high-performance computer systems using Intel's Merced microprocessor.

38. SRC Labs, LLC's parent company is the successor to SRC Computers.

39. Jim Guzy is a co-founder of Intel Corporation and served on Intel's board for 38 years.

40. Mr. Guzy was named to Forbes Midas List, which surveys the top tech deal makers in the world, in 2006 and 2007.

41. Seymour Cray was an American electrical engineer and supercomputer architect who designed a series of computers that were the fastest in the world for decades.

42. Mr. Cray has been credited with creating the supercomputing industry.

43. Unfortunately, Mr. Cray died shortly after founding of SRC Computers.

44. But his legacy was carried on by Jon Huppenthal and a talented team of engineers that worked with Mr. Cray and Mr. Huppenthal for decades.

45. SRC Computers' focus was creating easy-to-program, general-purpose reconfigurable computing systems.

46. In early 1997, Mr. Huppenthal and his team realized that the microprocessors of the day had many shortcomings relative to the custom processing engines that they were used to.

47. As a result, they decided to incorporate dedicated processing elements built from Field Programmable Gate Arrays ("FPGAs") and that idea quickly evolved into a novel system combining reconfigurable processors and CPUs.

48. SRC Computers' heterogenous system had 100x performance, $1/50^{th}$ of the operating expense, $1/100^{th}$ of the power usage, and required $1/500^{th}$ of the space of more traditional computer systems.

49. SRC Computers' proven systems are used for some of the most demanding military and intelligence applications, including the simultaneous real-time processing and analysis of radar, flight and mission data collected from a variety of aerial vehicles in over 1,000 successful counter-terrorism and counter-insurgency missions for the U.S. Department of Defense.

50. SRC Computers offered its first commercial product in 2015 called the Saturn 1 server.

51. The Saturn 1 was 100 times faster than a server with standard Intel microprocessors while using 1 percent of the power.

52. The Saturn 1 was designed to be used in HP's Moonshot server chassis for data centers.

53. SRC Computers has had over 30 U.S. patents issued for its innovative technology.

54. SRC Computers' patent portfolio covers numerous aspects of reconfigurable computing and has more than 1,800 forward citations.

V. MICROSOFT RECEIVED ACTUAL AND CONSTRUCTIVE NOTICE

55. SRC complied with 35 U.S.C. § 287 by (i) placing the required notice on all, or substantially all, of its products made, offered for sale, sold, or imported into the United States, and (ii) providing actual notice to Microsoft.

A. Constructive Notice to Microsoft.

56. For example, SRC placed the following notice on all, or substantially all, of its products since at least September 30, 2010:[3]

[3] https://web.archive.org/web/20100930014237/http://www.srccomp.com/techpubs/patentedtech.asp.

57. The website listed in the notice, WWW.SRCCOMP.COM/TECHPUBS/PATENTEDTECH.ASP, states the following:

> **SRC® PATENTED TECHNOLOGY**
>
> SRC Computers holds fundamental U.S. and foreign patents covering hardware and software techniques for vastly accelerating data processing through the use of reconfigurable elements comprising one or more Direct Execution Logic blocks operating in conjunction with one or more commodity microprocessors.
>
> SRC patented technology, with filing dates back to 1997, also includes a number of general applications of Direct Execution Logic computing systems for parallelizing the execution of user-defined algorithms including acceleration of web site access and processing.
>
> SRC Computers has exclusive rights to the following patents:

58. The website has listed at least the following patents since September 30, 2010. The patents asserted in this case are highlighted:

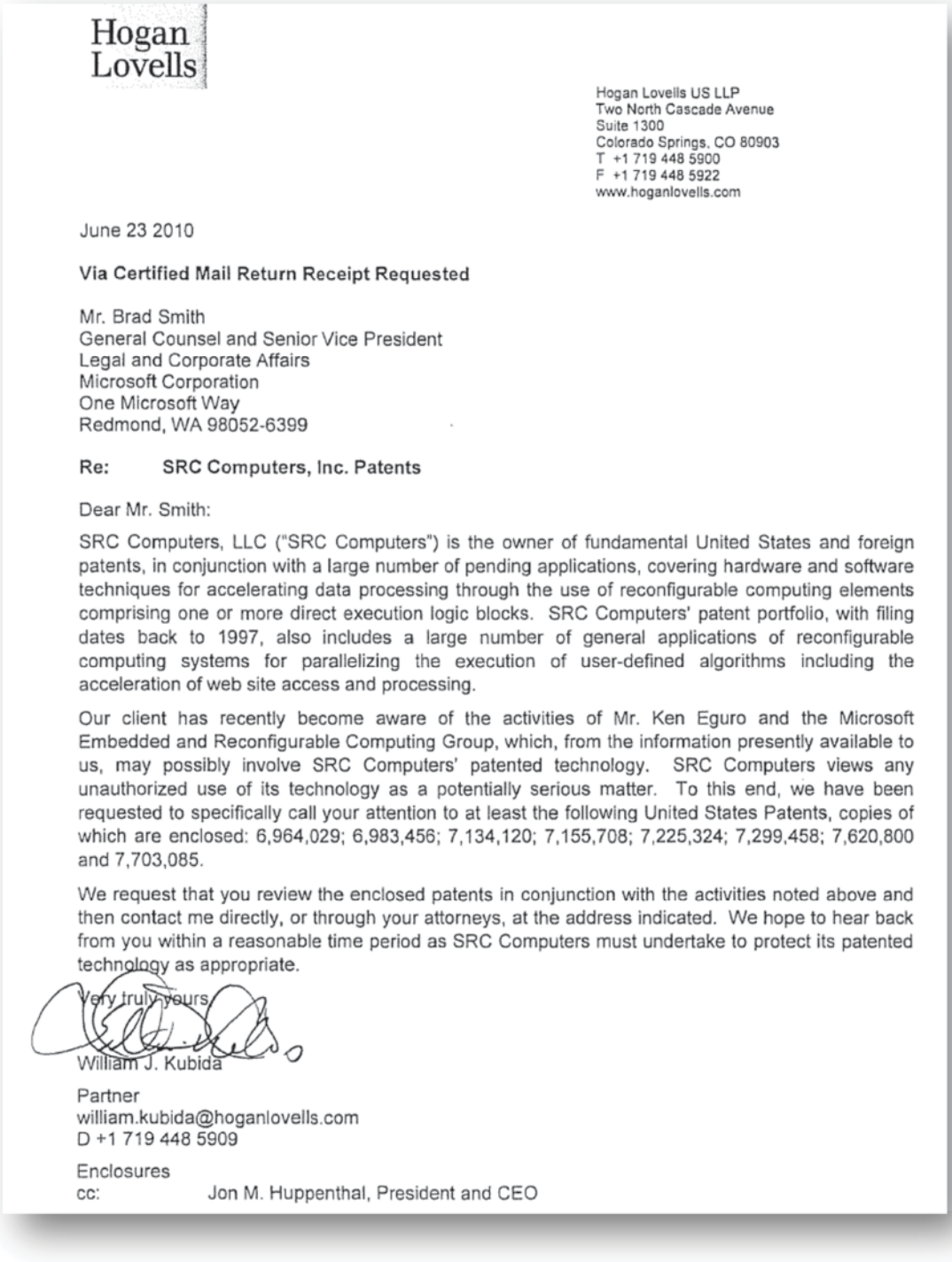
Patent #	**Patent Title**
6,026,459	System and method for dynamic priority conflict resolution in a multi-processor computer system having shared memory resources
6,076,152	Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem
6,247,110	Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem
6,295,598	Split directory-based cache coherency technique for a multi-processor computer system
6,339,819	Multiprocessor with each processor element accessing operands in loaded input buffer and forwarding results to FIFO output buffer
6,434,687	System and method for accelerating web site access and processing utilizing a computer system incorporating reconfigurable processors operating under a single operating system image
6,356,983	System and method providing cache coherency and atomic memory operations in a multiprocessor computer architecture
6,594,736	System and method for semaphore and atomic operation management in a multiprocessor
6,627,985	Reconfigurable processor module comprising hybrid stacked integrated circuit die elements

6,781,226	Reconfigurable processor module comprising hybrid stacked integrated circuit die elements
6,836,823	Bandwidth enhancement for uncached devices
6,941,539	Efficiency of reconfigurable hardware
6,961,841	Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem
6,964,029	System and method for partitioning control-dataflow graph representations
6,983,456	Process for converting programs in high-level programming languages to a unified executable for hybrid computing platforms
6,996,656	System and method for providing an arbitrated memory bus in a hybrid computing system
7,003,593	Computer system architecture and memory controller for close-coupling within a hybrid processing system utilizing an adaptive processor interface port
7,124,211	System and method for explicit communication of messages between processes running on different nodes in a clustered multiprocessor system
7,126,214	Reconfigurable processor module comprising hybrid stacked integrated circuit die elements
7,134,120	Map compiler pipelined loop structure
7,149,867	System and method of enhancing efficiency and utilization of memory bandwidth in reconfigurable hardware
7,155,602	Interface for integrating reconfigurable processors into a general purpose computing system
7,155,708	Debugging and performance profiling using control-dataflow graph representations with reconfigurable hardware emulation
7,167,976	Interface for integrating reconfigurable processors into a general purpose computing system
7,197,575	Switch/network adapter port coupling a reconfigurable processing element to one or more microprocessors for use with interleaved memory controllers
7,225,324	Multi-adaptive processing systems and techniques for enhancing parallelism and performance of computational functions
7,237,091	Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem
7,282,951	Reconfigurable processor module comprising hybrid stacked integrated circuit die elements
7,299,458	System and method for converting control flow graph representations to control-dataflow graph representations
7,373,440	Switch/network adapter port for clustered computers employing a chain of multi-adaptive processors in a dual in-line memory module format

7,406,573	Reconfigurable processor element utilizing both coarse and fine grained reconfigurable elements
7,421,524	Switch/network adapter port for clustered computers employing a chain of multi-adaptive processors in a dual in-line memory module format
7,424,552	Switch/network adapter port incorporating shared memory resources selectively accessible by a direct execution logic element and one or more dense logic devices
7,565,461	Switch/network adapter port coupling a reconfigurable processing element to one or more microprocessors for use with interleaved memory controllers
7,620,800	Multi-adaptive processing systems and techniques for enhancing parallelism and performance of computational functions

B. Actual Notice to Microsoft

59. On June 23, 2010, SRC Computers sent Microsoft the following letter to put Microsoft on notice of at least the following U.S. Patent Nos. 6,964,029, 6,983,456, 7,134,120, 7,155,708, 7,225,324, 7,299,458, 7,620,800, and 7,703,085:



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June 23 2010

Via Certified Mail Return Receipt Requested

Mr. Brad Smith
General Counsel and Senior Vice President
Legal and Corporate Affairs
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Re: SRC Computers, Inc. Patents

Dear Mr. Smith:

SRC Computers, LLC ("SRC Computers") is the owner of fundamental United States and foreign patents, in conjunction with a large number of pending applications, covering hardware and software techniques for accelerating data processing through the use of reconfigurable computing elements comprising one or more direct execution logic blocks. SRC Computers' patent portfolio, with filing dates back to 1997, also includes a large number of general applications of reconfigurable computing systems for parallelizing the execution of user-defined algorithms including the acceleration of web site access and processing.

Our client has recently become aware of the activities of Mr. Ken Eguro and the Microsoft Embedded and Reconfigurable Computing Group, which, from the information presently available to us, may possibly involve SRC Computers' patented technology. SRC Computers views any unauthorized use of its technology as a potentially serious matter. To this end, we have been requested to specifically call your attention to at least the following United States Patents, copies of which are enclosed: 6,964,029; 6,983,456; 7,134,120; 7,155,708; 7,225,324; 7,299,458; 7,620,800 and 7,703,085.

We request that you review the enclosed patents in conjunction with the activities noted above and then contact me directly, or through your attorneys, at the address indicated. We hope to hear back from you within a reasonable time period as SRC Computers must undertake to protect its patented technology as appropriate.

Very truly yours,

William J. Kubida

Partner
william.kubida@hoganlovells.com
D +1 719 448 5909

Enclosures
cc: Jon M. Huppenthal, President and CEO

60. On September 30, 2015, Geoffrey Hoggard, the Director of IP Licensing and Acquisitions at Microsoft, was offered an opportunity to acquire SRC's patent portfolio.

61. Mr. Hoggard was provided with detailed materials concerning SRC's entire patent portfolio.

62. Mr. Hoggard then had engineers at Microsoft carefully evaluate each of SRC's patents.

VI. MICROSOFT COPIED SRC'S TECHNOLOGY

63. Six months after receiving SRC's notice letter in 2010, Microsoft started a project called Catapult to investigate alternative architectural designs and specifically hardware such as field-programmable gate arrays (FPGAs) and custom application-specific integration circuits to solve two specific problems: (1) stresses in silicon ecosystem driven by diminishing rates of CPU improvements and (2) growing compute demands of AI applications and services.

64. The resulting Catapult FPGA Accelerator that Microsoft deployed to solve these problems copies inventions disclosed by SRC in the patents listed in its notice letter.

65. According to a Wired Article (https://www.wired.com/2016/09/microsoft-bets-future-chip-reprogram-fly/), Microsoft's Andrew Putnam claims to have come up with a design for hardware that could run Bing's machine learning algorithms on FPGAs in December 2010.

66. Remarkably, Mr. Putnam states that he drew up his initial design in a Starbucks in Colorado Springs where, coincidentally, SRC was headquartered.

67. Andrew Putnam and Doug Burger are the co-founders of Project Catapult.

68. This FPGA solution was then pitched by Doug Burger to Microsoft's executives, including Steve Ballmer, as a low-power way of accelerating searches.

69. This was the beginning of Project Catapult.

70. The Catapult team began to evaluate alternative architectural designs and specialized hardware such as graphics processing units (GPUs), field-programmable gate arrays (FPGAs) and custom application-specific integration circuits (ASICs).

71. The FPGAs in the Catapult FPGA Accelerator support partial reconfiguration, which allows you to keep the shell while reconfiguring the application logic.

72. By exploiting the reconfigurable nature of FPGAs, at the server, the Catapult architecture delivers the efficiency and performance of custom hardware without the cost, complexity and risk of deploying fully customized ASICs into the data center.

73. The net results deliver substantial savings and an industry-leading 40 gigaops/W energy efficiency for deployed at-scale accelerators.

74. Below is the timeline of the Catapult project:

Timeline:

- **2010:** Microsoft researchers meet with Bing executives to propose using FPGAs to accelerate Indexserve.
- **2011:** A team of Microsoft software engineers and researchers come together to address a huge processing problem: how to use customized, programmable integrated circuits to accelerate computationally expensive operations in Bing's Indexserve engine.
- **2012:** Large scale pilot of FPGA boards in each of 1,632 servers and wiring them with a custom secondary network.
- **2013:** Results of pilot demonstrated positive ROI, allowed latency improvements in ranking while cutting the number of required servers in half. Decision was made to go to production.
- **2014:** Publication of paper and decision to merge Bing design with Microsoft's converged SKU, adding to the v2 architecture that enables configurable clouds.
- **2015:** Ramp up to large-scale production in Bing and Azure.
- **2016:** "Configurable Cloud" architecture in nearly every new production server. Configurable Cloud paper published (Micro 2016, October)

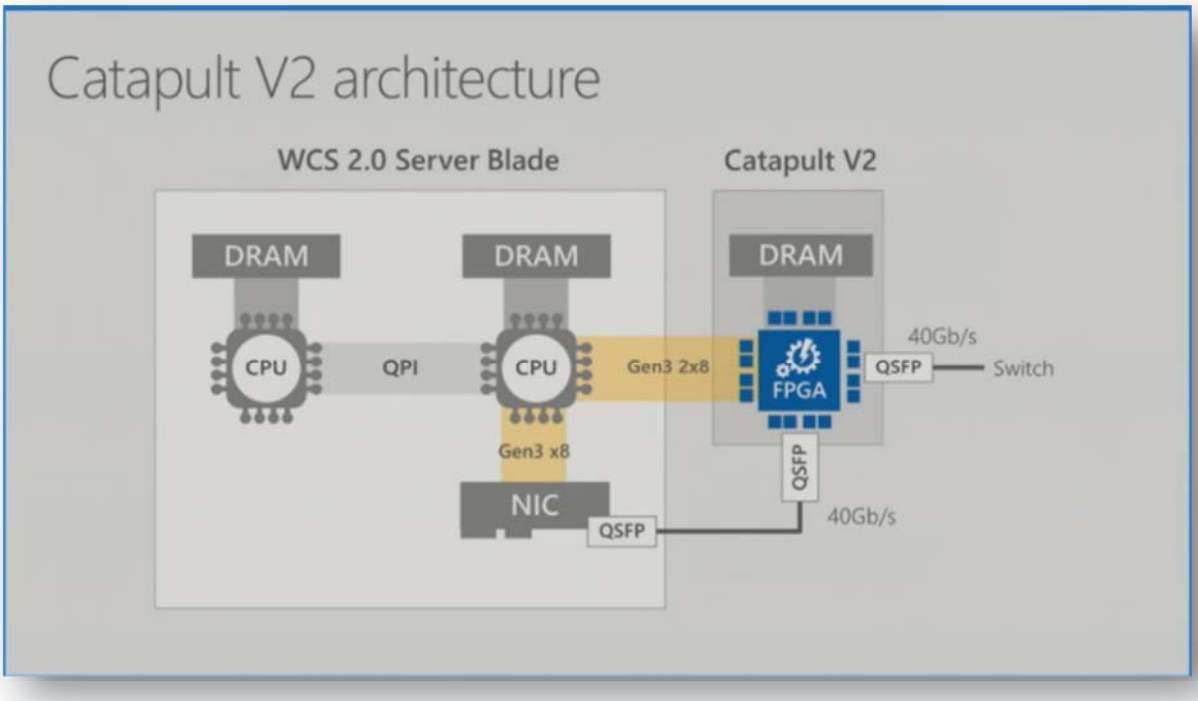
75. To deploy the Catapult FPGA Accelerator, Microsoft rewrote its Bing (search engine) ranker code as hardware logic using Verilog HDL.

76. To test the Catapult FPGA accelerator board architecture, Microsoft deployed 1,632 machines that were organized in 17 server racks at a Microsoft data center in Virginia.

77. The pilot program was very successful and resulted in a 2x increase in search throughput on Bing.

78. Because of this success, Project Catapult went live in early 2015 utilizing Catapult V2 architecture.

79. The Catapult FPGA Accelerator V2 architecture is shown below:



80. The FPGAs in the Catapult V2 architecture have a "Shell" that handles all I/O and management tasks and a "Role" that is only application logic, as pictured below:

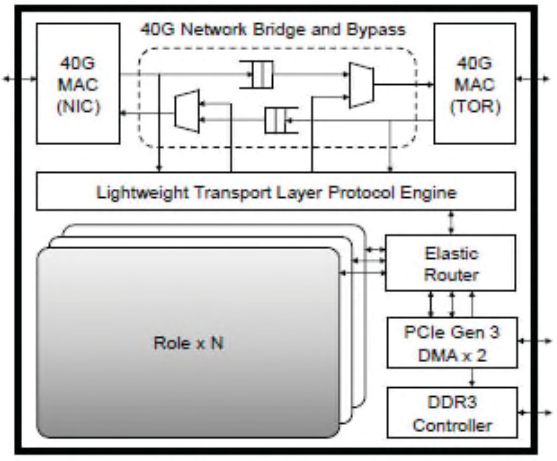


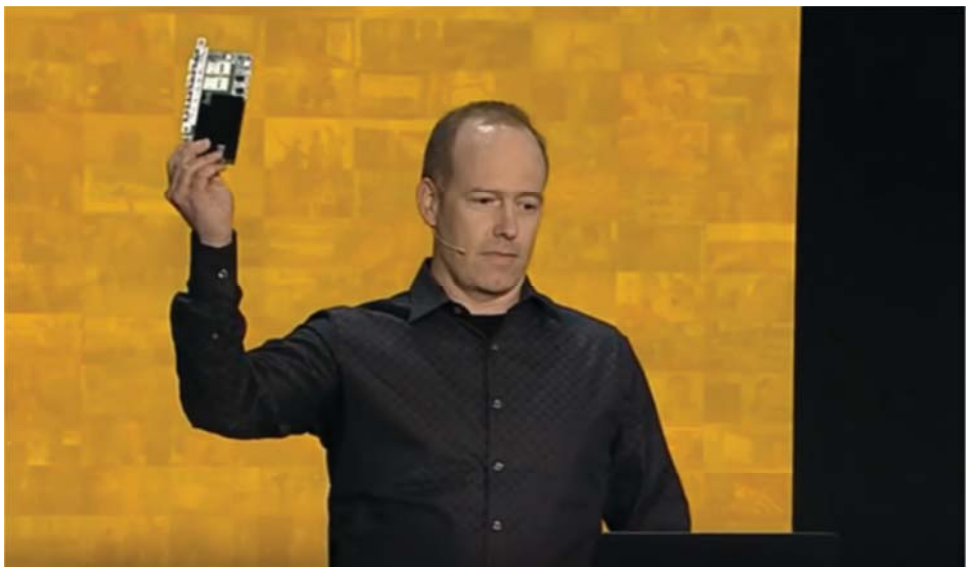
Fig. 4. The Shell Architecture in a Single FPGA.

	ALMs	MHz
Role	55340 (32%)	175
40G MAC/PHY (TOR)	9785 (6%)	313
40G MAC/PHY (NIC)	13122 (8%)	313
Network Bridge / Bypass	4685 (3%)	313
DDR3 Memory Controller	13225 (8%)	200
Elastic Router	3449 (2%)	156
LTL Protocol Engine	11839 (7%)	156
LTL Packet Switch	4815 (3%)	-
PCIe DMA Engine	6817 (4%)	250
Other	8273 (5%)	-
Total Area Used	**131350 (76%)**	-
Total Area Available	172600	-

Fig. 5. Area and frequency breakdown of production-deployed image with remote acceleration support.

81. Each FPGA has a Direct Memory Access ("DMA") interface that allows it to access main system memory directly.

82. Below is a picture of Doug Burger holding a Catapult FPGA accelerator board.



83. Now nearly every new server in Microsoft data centers is equipped with a Catapult FPGA accelerator board giving every new Microsoft data center server a unique distributed architecture.

84. The distributed architecture deploys FPGAs as an addition to each data center server, rather than a bolt-on isolated cluster, to create an "acceleration fabric" throughout the data center.

85. This elastic reconfigurable acceleration fabric provides the flexibility to harness an individual FPGA or up to thousands of FPGAs for a single service.

86. Today, all three of Microsoft major online services—Bing, Azure, and Office 365—run on Catapult's infringing FPGA accelerator boards.

87. Despite copying technology developed by SRC, Microsoft won the "Innovation of the Year" award for Project Catapult at the 2017 GeekWire Awards.

88. Microsoft's CEO, Satya Nadella, said at the 2016 Ignite conference in Atlanta that he believes that FPGAs are "no longer just research" for Microsoft but instead an "essential priority" for the company.

89. Currently, FPGAs are being used by Microsoft servers in 15 countries on five different continents.

90. Microsoft's investment in FGPAs is so massive that it shifted the worldwide chip market.

91. Microsoft purchases its FPGAs from Altera.

92. Microsoft's investment in FPGAs has been so huge that it resulted in Intel acquiring Altera in December 2015 for $16.7 billion.

93. Intel's executive vice president, Diane Bryant, told Wired last year that by 2020, "a third of all servers inside all the major cloud computing companies will include FPGAs."[4]

VII. THE PATENTS

A. All Asserted Patents are Owned by the Tribe and Licensed by SRC Labs, LLC.

94. On August 1, 2017, all the patents asserted in this case were assigned to the Tribe.

95. The assignment was recorded at the USPTO on August 2, 2017.

96. The Tribe subsequently entered into an Exclusive License Agreement with Right to Sublicense with SRC Labs, LLC that granted SRC the right to practice the patents and sue third-parties for past, present, and future infringement.

97. All maintenance fees have been paid to the USPTO to keep all the patents in suit enforceable for their full term.

B. Description of the Asserted Patents.

1. U.S. Patent 6,076,152 (the "'152 patent").

98. The '152 patent is entitled "Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem" and issued on June 13, 2000.

[4] https://www.wired.com/2016/09/microsoft-bets-future-chip-reprogram-fly/.

99. A true and correct copy of the '152 patent is attached as **Exhibit A**.

100. The '152 patent is valid and enforceable.

2. U.S. Patent 6,247,110 (the "'110 patent).

101. The '110 patent is entitled "Multiprocessor computer architecture incorporating a plurality of memory algorithm processors in the memory subsystem" and issued on June 12, 2001.

102. A true and correct copy of the '110 patent is attached as **Exhibit B.**

103. The '110 patent is valid and enforceable.

3. U.S. Patent 6,434,687 (the "'687 patent").

104. The '687 patent is entitled "System and method for accelerating web site access and processing utilizing a computer system incorporating reconfigurable processors operating under a single operating system image" and issued on August 13, 2002.

105. A true and correct copy of the '687 patent is attached as **Exhibit C.**

106. The '687 patent is valid and enforceable.

4. U.S. Patent 7,225,324 (the "'324 patent").

107. The '324 patent is entitled "Multi-adaptive processing systems and techniques for enhancing parallelism and performance of computational functions" and issued on May 29, 2007.

108. A true and correct copy of the '324 patent is attached as **Exhibit D.**

109. The '324 patent is valid and enforceable.

5. U.S. Patent 7,421,524 (the "'524 patent").

110. The '524 patent is entitled "Switch/network adapter port for clustered computers employing a chain of multi-adaptive processors in a dual in-line memory module format" and issued on September 2, 2008.

111. A true and correct copy of the '524 patent is attached as **Exhibit E**.

112. The '524 patent is valid and enforceable.

6. U.S. Patent 7,620,800 (the "'800 patent").

113. The '800 patent is entitled "Multi-adaptive processing systems and techniques for enhancing parallelism and performance of computational functions" and issued on November 17, 2009.

114. A true and correct copy of the '800 patent is attached as **Exhibit F.**

115. The '800 patent is valid and enforceable.

VIII. COUNT ONE: DIRECT INFRINGEMENT OF THE '152 PATENT

116. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

117. Microsoft has at no time, either expressly or impliedly, been licensed under the '152 patent.

118. Microsoft has been and continues to directly infringe claims 1-7, 11, 12, 15, 18, and 21 of the '152 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at least Office 365, Bing, and Azure, as shown in **Exhibit G**.[5]

119. Microsoft's direct infringement of the '152 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

[5] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

IX. COUNT TWO: WILLFUL INFRINGEMENT OF THE '152 PATENT

120. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

121. Microsoft has been willfully infringing the '152 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

122. Upon information and belief, Microsoft obtained actual knowledge of the '152 patent since 2010 when SRC sent its notice letter.

123. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '152 patent.

124. Alternatively, Microsoft has had actual knowledge of the '152 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

125. As part of its diligence, Microsoft engineers carefully evaluated each of SRC's patents, including the '152 patent.

126. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1-7, 11, 12, 15, 18, and 21 of the '152 patent.

127. Microsoft blatantly and intentionally copied the inventions disclosed in the '152 patent.

128. And Microsoft has made no effort to avoid infringing the '152 patent.

129. Microsoft did not obtain an opinion of counsel concerning its infringement of the '152 patent or the validity of the '152 patent before launching infringing online services that utilize FPGA Accelerators.

130. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft's willful infringement under 35 U.S.C. § 284.

X. COUNT THREE: DIRECT INFRINGEMENT OF THE '110 PATENT

131. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

132. Microsoft has at no time, either expressly or impliedly, been licensed under the '110 patent.

133. Microsoft has been and continues to directly infringe claims 1-7, 11, 12, 15, 18, and 21 of the '110 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at least Office 365, Bing, and Azure, as shown in **Exhibit H**.[6]

134. Microsoft's direct infringement of the '110 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

XI. COUNT FOUR: WILLFUL INFRINGEMENT OF THE '110 PATENT

135. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

136. Microsoft has been willfully infringing the '110 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

137. Upon information and belief, Microsoft obtained actual knowledge of the '110 patent since 2010 when SRC sent its notice letter.

[6] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

138. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '110 patent.

139. Alternatively, Microsoft has had actual knowledge of the '110 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

140. As part of its diligence, Microsoft engineers carefully evaluated each of SRC's patents, including the '110 patent.

141. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1-7, 11, 12, 15, 18, and 21 of the '110 patent.

142. Microsoft blatantly and intentionally copied the inventions disclosed in the '110 patent.

143. And Microsoft has made no effort to avoid infringing the '110 patent.

144. Microsoft did not obtain an opinion of counsel concerning its infringement of the '110 patent or the validity of the '110 patent before launching infringing online services that utilize FPGA Accelerators.

145. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft's willful infringement under 35 U.S.C. § 284.

XII. COUNT FIVE: DIRECT INFRINGEMENT OF THE '687 PATENT

146. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

147. Microsoft has at no time, either expressly or impliedly, been licensed under the '687 patent.

148. Microsoft has been and continues to directly infringe claims 1-5, 10-13, 18, and 25 of the '687 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at least Office 365, Bing, and Azure, as shown in **Exhibit I**.[7]

149. Microsoft's direct infringement of the '687 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

XIII. COUNT SIX: INDIRECT INFRINGEMENT OF THE '687 PATENT

150. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

151. Microsoft induces infringement under 35 U.S.C. § 271(b) by actively and knowingly aiding and abetting the direct infringement of at least the following companies: Apple Siri and Yahoo! Search.

152. Bing powers Yahoo! Search and Apple Siri.

153. Microsoft has induced infringement of the '687 patent by offering Bing to power Yahoo! Search and Apple Siri specifically in ways that infringe the '687 patent.

154. Upon information and belief, Microsoft obtained actual knowledge of the '687 patent since 2010 when SRC sent its notice letter.

155. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '687 patent.

[7] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

156. Alternatively, Microsoft has had actual knowledge of the ’687 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

157. As part of its diligence, Microsoft engineers carefully evaluated each of SRC’s patents, including the ’687 patent.

158. As a result, Microsoft knew, or should have known, that its actions would result in Apple Siri and Yahoo! Search to infringe claims of the ’687 patent.

159. None of the above listed entities have ever been expressly or impliedly licensed under the ’687 patent.

XIV. COUNT SEVEN: WILLFUL INFRINGEMENT OF THE ’687 PATENT

160. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

161. Microsoft has been willfully infringing the ’687 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

162. Upon information and belief, Microsoft obtained actual knowledge of the ’687 patent since 2010 when SRC sent its notice letter.

163. Upon information and belief, Microsoft investigated SRC’s entire portfolio after receiving this letter, including the ’687 patent.

164. Alternatively, Microsoft has had actual knowledge of the ’687 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

165. As part of its diligence, Microsoft engineers carefully evaluated each of SRC’s patents, including the ’687 patent.

166. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1-5, 10-13, 18, and 25 of the '687 patent.

167. Microsoft blatantly and intentionally copied the inventions disclosed in the '687 patent.

168. And Microsoft has made no effort to avoid infringing the '687 patent.

169. Microsoft did not obtain an opinion of counsel concerning its infringement of the '687 patent or the validity of the '687 patent before launching infringing online services that utilize FPGA Accelerators.

170. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft's willful infringement under 35 U.S.C. § 284.

XV. COUNT EIGHT: DIRECT INFRINGMENT OF THE '324 PATENT

171. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

172. Microsoft has at no time, either expressly or impliedly, been licensed under the '324 patent.

173. Microsoft has been and continues to directly infringe claims 1, 8, 9, 17, 18, 21, 22, and 23 of the '324 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at Bing, Microsoft's Deep Convolution Neural Networks, and other similar products, as shown in **Exhibit J**.[8]

174. Microsoft's direct infringement of the '324 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an

[8] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

XVI. COUNT NINE: INDIRECT INFRINGEMENT OF THE '324 PATENT

175. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

176. Microsoft induces infringement under 35 U.S.C. § 271(b) by actively and knowingly aiding and abetting the direct infringement of at least the following companies: Apple Siri and Yahoo! Search.

177. Bing powers Yahoo! Search and Apple Siri.

178. Microsoft has induced infringement of the '324 patent by offering Bing to power Yahoo! Search and Apple Siri specifically in ways that infringe the '324 patent.

179. Microsoft obtained actual knowledge of the '324 patent in 2010 when SRC sent its notice letter.

180. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '324 patent.

181. In addition, Microsoft has had actual knowledge of the '324 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

182. As part of its diligence, Microsoft engineers carefully evaluated each of SRC's patents, including the '324 patent.

183. As a result, Microsoft knew, or should have known, that its actions would result in Apple Siri and Yahoo! Search to infringe claims of the '324 patent.

184. None of the above listed entities have ever been expressly or impliedly licensed under the ’324 patent.

XVII. COUNT TEN: WILLFUL INFRINGEMENT OF THE ’324 PATENT

185. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

186. Microsoft has been willfully infringing the ’324 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

187. Microsoft acquired actual knowledge of the ’324 patent in 2010 when SRC sent its notice letter.

188. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1, 8, 9, 17, 18, 21, 22, and 23 of the ’324 patent.

189. Microsoft blatantly and intentionally copied the inventions disclosed in the ’324 patent after receiving SRC’s notice letter in 2010.

190. And Microsoft has made no effort to avoid infringing the ’324 patent.

191. Microsoft did not obtain an opinion of counsel concerning its infringement of the ’324 patent or the validity of the ’324 patent before launching infringing online services that utilize FPGA Accelerators.

192. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft’s willful infringement under 35 U.S.C. § 284.

XVIII. COUNT ELEVEN: DIRECT INFRINGEMENT OF THE ’524 PATENT

193. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

194. Microsoft has at no time, either expressly or impliedly, been licensed under the ’524 patent.

195. Microsoft has been and continues to directly infringe claims 1, 2, 13, and 15 of the '524 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at least Office 365, Bing, and Azure as shown in **Exhibit K**.[9]

196. Microsoft's direct infringement of the '524 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

XIX. COUNT TWELVE: WILLFUL INFRINGEMENT OF THE '524 PATENT

197. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

198. Microsoft has been willfully infringing the '524 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

199. Upon information and belief, Microsoft obtained actual knowledge of the '524 patent since 2010 when SRC sent its notice letter.

200. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '524 patent.

201. Alternatively, Microsoft has had actual knowledge of the '524 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

202. As part of its diligence, Microsoft engineers carefully evaluated each of SRC's patents, including the '524 patent.

[9] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

203. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1, 2, 13, and 15 of the '524 patent.

204. Microsoft blatantly and intentionally copied the inventions disclosed in the '524 patent.

205. And Microsoft has made no effort to avoid infringing the '524 patent.

206. Microsoft did not obtain an opinion of counsel concerning its infringement of the '524 patent or the validity of the '524 patent before launching infringing online services that utilize FPGA Accelerators.

207. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft's willful infringement under 35 U.S.C. § 284.

XX. COUNT THIRTEEN: DIRECT INFRINGMENT OF THE '800 PATENT

208. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

209. Microsoft has at no time, either expressly or impliedly, been licensed under the '800 patent.

210. Microsoft has been and continues to directly infringe claims 1, 8, 9, 17, 18, 21, 22, and 23 of the '800 patent by making, using, offering for sale, and selling in the United States in violation of 35 U.S.C. § 271(a) all of their online services that utilize FPGA Accelerators, which includes at least Bing, Microsoft's Deep Convolution Neural Networks, and other similar products, as shown in **Exhibit L**.[10]

211. Microsoft's direct infringement of the '800 patent has caused, and will continue to cause, substantial and irreparable damage to Plaintiffs. Plaintiffs are therefore entitled to an

[10] This chart is exemplar of all Microsoft's web services that utilize FPGA Accelerators.

award of damages adequate to compensate for Microsoft's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

XXI. COUNT FOURTEEN: INDIRECT INFRINGEMENT OF THE '800 PATENT

212. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

213. Microsoft induces infringement under 35 U.S.C. § 271(b) by actively and knowingly aiding and abetting the direct infringement of at least the following companies: Apple Siri and Yahoo! Search.

214. Bing powers Yahoo! Search and Apple Siri.

215. Microsoft has induced infringement of the '800 patent by offering Bing to power Yahoo! Search and Apple Siri specifically in ways that infringe the '800 patent.

216. Microsoft obtained actual knowledge of the '800 patent in 2010 when SRC sent its notice letter.

217. Upon information and belief, Microsoft investigated SRC's entire portfolio after receiving this letter, including the '800 patent.

218. In addition, Microsoft has had actual knowledge of the '800 patent since at least September 30, 2015 when Geoffrey Hoggard at Microsoft entered into discussions with SRC concerning a potential acquisition of the SRC portfolio.

219. As part of its diligence, Microsoft engineers carefully evaluated each of SRC's patents, including the '800 patent.

220. As a result, Microsoft knew, or should have known, that its actions would result in Apple Siri and Yahoo! Search to infringe claims of the '800 patent.

221. None of the above listed entities have ever been expressly or impliedly licensed under the ’800 patent.

XXII. COUNT FIFTEEN: WILLFUL INFRINGEMENT OF THE ’800 PATENT

222. Plaintiffs incorporate by reference all paragraphs above as though set forth herein.

223. Microsoft has been willfully infringing the ’800 patent since early 2015 when it deployed FPGA Accelerators in all of its servers.

224. Microsoft acquired actual knowledge of the ’800 patent in 2010 when SRC sent its notice letter.

225. Microsoft has continued making, using, offering for sale, selling online services that utilize FPGA Accelerators despite an objectively high likelihood that its actions infringe claims 1, 8, 9, 17, 18, 21, 22, and 23 of the ’800 patent.

226. Microsoft blatantly and intentionally copied the inventions disclosed in the ’800 patent after receiving SRC’s notice letter in 2010.

227. And Microsoft has made no effort to avoid infringing the ’800 patent.

228. Microsoft did not obtain an opinion of counsel concerning its infringement of the ’800 patent or the validity of the ’800 patent before launching infringing online services that utilize FPGA Accelerators.

229. Therefore, Plaintiffs should receive enhanced damages up to three times the amount of actual damages for Microsoft’s willful infringement under 35 U.S.C. § 284.

XXIII. JURY DEMAND

230. Plaintiffs hereby demand a trial by jury for all causes of action.

XXIV. PRAYER FOR RELIEF

Plaintiff requests the following relief:

A. A judgment that Microsoft has infringed and continues to infringe the '152, '110, '687, '324, '524, and '800 patents;

B. A judgment and Order requiring Microsoft to pay Plaintiffs damages under 35 U.S.C. § 284, including treble damages for willful infringement as provided by 35 U.S.C. § 284, and supplemental damages for any continuing post-verdict infringement through entry of the final judgment with an accounting as needed;

C. A judgment and Order requiring Microsoft to pay Plaintiffs pre-judgment and post-judgment interest on the damages awarded;

D. A judgment and Order awarding a compulsory on-going royalty; and

E. Such other and further relief as the Court deems just and equitable.

DATED: October 18, 2017

/s/

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